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Reflections on interpretive supply chain research

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Abstract

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REFLECTIONS ON INTERPRETIVE SUPPLY CHAIN RESEARCH

by

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ABSTRACT

A key purpose of this paper is to stimulate researchers into utilising a more balanced portfolio of research methods when generating supply chain theory. The supply chain/logistics literature overwhelmingly exhibits objectivist/positivist philosophical assumptions, indicating that this is what researchers believe constitutes valid discipline knowledge. In contrast, this paper demonstrates that an interpretive perspective is capable of yielding a comprehensive picture of the relationship between the supply chain and the 'messy' environment within which it is embedded (contingency theory). By reflecting on lessons learned through many years of practical researcher experience with such a methodology, this paper serves to motivate the supply chain research community to consider adopting a more interpretive stance when conducting supply chain research.

KEYWORDS
Qualitative Research, Triangulation, Supply Chain Audit, Quick Scan, Audit, Field Research

INTRODUCTION

Supply chain management (SCM) concepts continue to be not well-understood, which has led to a call for clear definitions and meaningful conceptual frameworks (Cooper et al., 1997; Croom et al., 2000; Flynn et al., 2010; New & Payne, 1995; Svensson, 2002; van der Vaart & van Donk, 2008).

Although qualitative research methods are being used to acquire the empirical research data needed to support theoretical propositions, such studies remain firmly in the minority. A key purpose of this paper is to motivate supply chain researchers to consider alternative research perspectives so that they might consider incorporating an interpretive stance within a balanced portfolio of supply chain research methods. The authors reflect on some 30 years of academic publications to deduce what currently constitutes valid supply chain discipline knowledge and on some 15 years of experience working with an interpretive, mixed-methods field research methodology. Robust, mixed-methods approaches are advocated that offer a variety of insightful perspectives on supply chain phenomena.

The next section explores the conceptual landscape within which supply chain research is performed. This is followed by description and discussion of a well-established, mixed-methods approach developed and validated for use in the field.

SUPPLY CHAIN MANAGEMENT RESEARCH CONTEXT

The subject of supply chain management is viewed from many different perspectives: purchasing and supply, operations management, relationship management, logistics and transportation, industrial organisation, marketing, or strategic management to name but a few (Croom et al., 2000). Thus as a broad concept, it is perhaps unsurprising that it lacks a single, widely accepted definition (Cigolini et al., 2004; Flynn et al., 2010; Mentzer et al., 2004). Table 1 indicates the relative frequency of supply chain/logistics research methods that have appeared in the publications named in the past 30 years. It is clear that the dominant research methods have long been guided by a dominant world view favouring the positivist/objective research paradigm (Eisenhardt, 1989; Gammelgaard, 2004; Seuring, 2005), in which the researcher subscribes to the view that an 'objective' world, or an objective reality exists - and that reality can be understood through the application of such objective/quantitative methods as surveys and statistical analysis.

TABLE 1
FREQUENCY OF QUANTITATIVE AND QUALITATIVE METHODS APPLIED IN SCM RESEARCH

Author	*Period*	*Journal or Topic*	*Quantitative*	*Qualitative*
Mentzer & Kahn (1995)	1978 – 1993	Journal of Business Logistics	~ 50%	~ 3.2%
Kotzab (2005)	1994 – 2005	Journal of Business Logistics	~ 45%	unknown
Seuring (2005)	1990 – 2005	Sustainable SCM	~ 42%	~ 11%
Carter & Ellram (2003)	1965 – 2001	The Journal of SCM	~ 60%	~ 18%

When attempting to develop well-substantiated supply chain/logistics management theories this world view is a real issue (Stuart et al., 2002) because supply chains are almost always managed within a context of constant environmental change, and involve many layers of complexity, personal relationship nuances, etc. On such 'shifting sands' posited generalisations and hypotheses become almost impossible to substantiate.

The fact that supply chain management problems are unstructured and even 'messy' (Ackoff, 1998) real-world problems (Frankel et al., 2005; Mentzer & Kahn, 1995; New & Payne, 1995; Seuring, 2005; Westbrook, 1994) requires that a 'one paradigm, one approach' perspective (irrespective of its persuasion) should not automatically be the obvious choice (Frankel et al., 2005; Seuring, 2005; Towill and Christopher, 2007). The alternative is an interpretive perspective that emphasises the importance of subjective meanings and social-political and symbolic actions in the processes through which humans construct and reconstruct their reality (Morgan 1983, p. 396). Thus, a strong argument can be made for adopting research methods appropriate to generating valid interpretive knowledge and involving field case studies that examine human endeavours within particular supply chain circumstances and social work settings.

Following on from the ontological belief that reality is socially constructed; the interpretive researcher avoids imposing externally defined categories on a phenomenon. Instead of coming to the field with a well-defined set of constructs and instruments with which to measure social reality, the interpretive researcher attempts to derive constructs from the field by in-depth examination of and exposure to the phenomenon of interest. The categories and themes that emerge out of this approach are intended to closely couple those relevant to the study's participants (Orlikowski and Baroudi, 1991).

A MIXED-METHODS APPROACH TO SUPPLY CHAIN RESEARCH

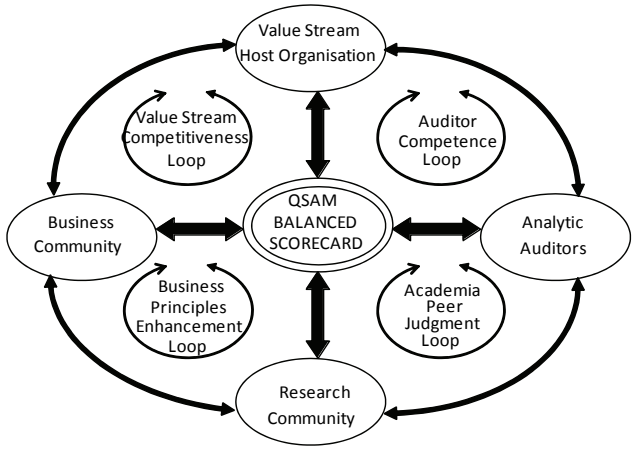
In the early 1990s a procedure known as the Quick Scan Audit Methodology (QSAM) originated from the Logistics Systems Dynamics Group at Cardiff University in the UK. This was originally created to describe and explain the complexities of a 'messy' European automotive supply chain environment via application of multiple, site-centred data collection methods.

QSAM utilises a structured modelling framework. A key characteristic is that it endeavours to achieve an optimum compromise between qualitative and quantitative methods of management theory research, by making maximum use of resources in field-based activities in the search for 'meaning of evidence' (Eisenhardt, 1989). In practise it mixes qualitative and quantitative methods when seeking to triangulate information sources (Beach et al, 2001; Berry et al. 1995; Jick, 1979).

QSAM researchers recognise that supply chain-specific issues need to be combined with management practises, such as marketing and strategic management; hence a complete 'rich' picture of the focal company situation is obtained through the application of systems thinking/theory. QSAM also provides contingency theory underpinning (Lawrence and Lorsch, 1967; Thompson, 1967) by considering industrial norms and environmental settings (Näslund, 2002).

Theoretical refinement of QSAM has involved untold brainstorming, debate, experimentation, and triangulation for the current format to emerge. It brings together four different key stakeholders having their own interests: the Host Organisation (What's in it for me?); The Business Community (What can we learn from them?); the Analytic Auditors (How do we rate this supply chain?); and the Research Community (What new knowledge is revealed?). The four parties are shown in a Balanced Scorecard format in Figure 1, which also indicates four feedback loops.

FIGURE 1
QSAM BALANCED SCORECARD – BRINGING TOGETHER FOUR INTERESTED PARTIES



The *Auditor Competence Loop* is critical, requiring that the auditors are well trained, focused, observant and capable of participation as a member of an academic-industry team. In particular they require an inquisitive mind, good time management skills, should not accept data or opinion at face value and should aim to achieve good data triangulation via different data sources. The *Value Stream Competitiveness Loop* codifies (and ranks) measures of supply chain performance against external benchmarks. A useful consequence of accumulating the QSAM audit results is that they also provide a rich benchmarking source in their own right. The *Academia Peer Judgement Loop* is where the quality of the final research output is assessed. Finally, there is the *Business Principles Enhancement Loop* where the knowledge gained influences real work practices. QSAM researchers need to balance the needs of these stakeholders.

QSAM PROCESS OVERVIEW

The research/audit process is typically undertaken by a team of experienced researchers assisted by host organisation supply chain 'players' in a structured approach designed to fit around the limited time available to busy managers and staff (Böhme et al., (2008); Naim et al., (2002)). Judgments regarding individual supply chains are based on a combination of case study-type metrics and statistically significant data. In seeking to maintain this standard the researchers aim to exploit knowledge from as many data sources as possible. The various site-based activities are designed to achieve maximum information volume and fidelity. A QSAM is inevitably both time and resource constrained and although data collection and analysis lies at its heart, front-end and back-end activities help to ensure that all participants 'sing from the same hymn sheet', and that the host organisation receives maximum benefit from the experience.

Audit data is collected from four distinct sources, which facilitates methodological triangulation and increases internal validity: process maps; attitudinal and quantitative questionnaires; semi-structured interviews; and examination of archival information. The goal of the various data collection techniques is to fully understand the phenomenon being studied, and the accumulation of multiple supporting sources of evidence helps to assure that the facts being collected are indeed correct (Meredith, 1998). Data triangulation also provides stronger substantiation of constructs and hypotheses (Eisenhardt, 1989), and the utilisation of multiple onsite investigators enables the case situation to be viewed from different perspectives, which adds to the richness of the data collected (Eisenhardt, 1989). This also helps to build confidence in the findings and increases the likelihood of surprise findings. In essence, triangulation improves researcher judgment accuracy by providing several sources of verification (Flynn et al., 1990).

A feature of research to build theory from subjective social realities in this manner is the frequent overlap of data analysis with data collection (Eisenhardt, 1989; Lewis et al., 1989). The central idea during the theory building process is to constantly compare theory and data – iterating toward theory that closely fits the data (Eisenhardt, 1989). During the QSAM theory-development process, logic replaces data as the basis for evaluation (Meredith, 1989).

A most critical element of a QSAM audit study concerns how data extracted from the supply chain system is analysed using systems thinking principles. Cause-effect analysis is utilised to reveal: (a) the 'major pain(s)' the company is feeling (symptoms of the underlying problems); (b) the supply chain/ process integration barriers; and, (c) the root (initiating) causes of the identified major pain(s).

VALIDATING THE QSAM APPROACH

Because field research is commonly perceived as being prone to construct error, poor internal and external validation, and questionable generalisability (Meredith, 1998) the same quality criteria need to be applied to subjective research as is applied in objective studies. Table 2 outlines how the key quality criteria: internal validity, external validity, reliability, and objectivity (van der Vorst & Beulens, 2002) are achieved during the QSAM audit. From this it may be concluded that QSAM is a robust and rigorous field research method, which continues to evolve as researchers in the field discover further ways to enhance it.

TABLE 2
ASSESSMENT OF THE QSAM AGAINST RESEARCH QUALITY CRITERIA

Dimension of research quality	*Definition*	*How achieved within the QSAM?*
Internal validity – *how accurately are cause-effect relationships identified?*	Establishing causal relationships between research variables (certain conditions are shown to lead to other conditions)	Use of a team of researchers for data collection (Böhme et al., 2008)
External validity – *can the findings be translated to other settings?*	Establishing the domain to which a study's findings can be generalised.	Comparison against database of previous QSAM applications (such as in Towill et al., 2002)
Reliability – *can the findings be reproduced by others?*	Demonstrating that the operations of a study can be repeated with the same results	Process well documented in literature (Böhme et al. 2008; Lewis et al., 1998; Naim et al., 2002) and existence of database (Towill et al., 2002)
Objectivity – *are the results free from bias?*	Establishing correct operational measures for the concepts being studied.	Triangulation via process mapping, data analysis, interviews and questionnaires (Naim et al., 2002; Böhme et al., 2008).

Adapted from: Potter & Bowles, 2006; van der Vorst & Beulens, 2002

DISCUSSION

Based on some 15 years of experiences with a particular method, it is the authors' belief that the supply chain management/logistics discipline would benefit if more researchers would take advantage of methods that generate valid interpretive knowledge; in particular when they involve site-based field case studies of managers within their social settings. The QSAM is an example of a mixed-methods approach that has proven to be extremely valuable for studying messy real-world supply chains, in particular because the researchers are reminded of the need to "understand and acknowledge the extent to which the perspective they adopt will focus their attention on some things and not others, and bias their perception of the phenomena they study" (Orlikowski and Baroudi, 1991, p. 23). Philosophically, its research methods emphasise the importance of subjective meanings and social-political and symbolic actions in the processes through which humans construct and reconstruct their reality (Morgan 1983, p. 396).

Working within a team ensures that QSAM researchers view the same case situation from different perspectives and in divergent ways; particularly when individuals are tasked with using specific methods (Eisenhardt, 1989). A further major strength involves data triangulation to maximise its validity. QSAM enables good practice, poor practice, and trends in performance to be detected (e.g., Childerhouse and Towill, 2004). Overall, QSAM audits have yielded a very

valuable and varied pool of empirical data and the understanding gained has manifestly enabled the development of new management theory and the validation, and more often further refinement, of research ideas (Childerhouse and Towill, 2004).

CONCLUSION

At a time when supply chain management concepts continue to be not particularly well-understood, this article has sought to present the benefits and challenges of interpretive research methods that seek to frame supply chain issues though a variety of theoretical lenses. In reflecting on some fifteen years of application and refinement of a mixed methods supply chain methodology the structured framework, administration requirements and overarching processes were summarised and justified. Guidelines for making sense of 'soft' data describing relationships between technology, people, and organisations in the supply chain were also presented.

To-date QSAM research findings have been published mainly as case studies (e.g. Potter et al., 2004) and quantitative value stream comparisons (e.g. Towill et al., 2002). Some 40 experts spread around eight universities worldwide have used the framework and its standard protocols to perform readily comparable assessments of real world supply chains. This team is keen to extend a hand to researchers who are interested in interpretive supply chain research that extends the QSAM research network. It is thus our hope that this paper may serve to motivate researchers to utilise a more balanced portfolio of research methods for studying supply chain phenomena than has been the case until now.

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